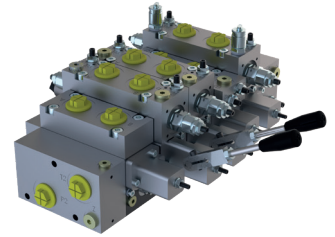


- Very flexibly combinable and load independent
- Pre-compensated and load-sensing
- High corrosion protection, K8 (Zn/Ni)
- Stainless steel adjusting screws
- $Q_{max} = 400$ l/min (without compensator 450 l/min)
- $p_{max} = 420$ bar

PMV-22



DESCRIPTION

The PMV concept is constructed to offer a high level of modularity. It allows a configuration of individual modules, which are available as pre-assembled units with their own type code. Modifications, to and between them, can also be carried out quickly in the field.

Due to the modular design, special solutions can also be created in a flexible manner. For example, counterbalance valves integrated in the connection plate or operated non-return valves can be integrated. By means of the 2-way pressure compensator, the flow can be controlled Independent from the load.

APPLICATION

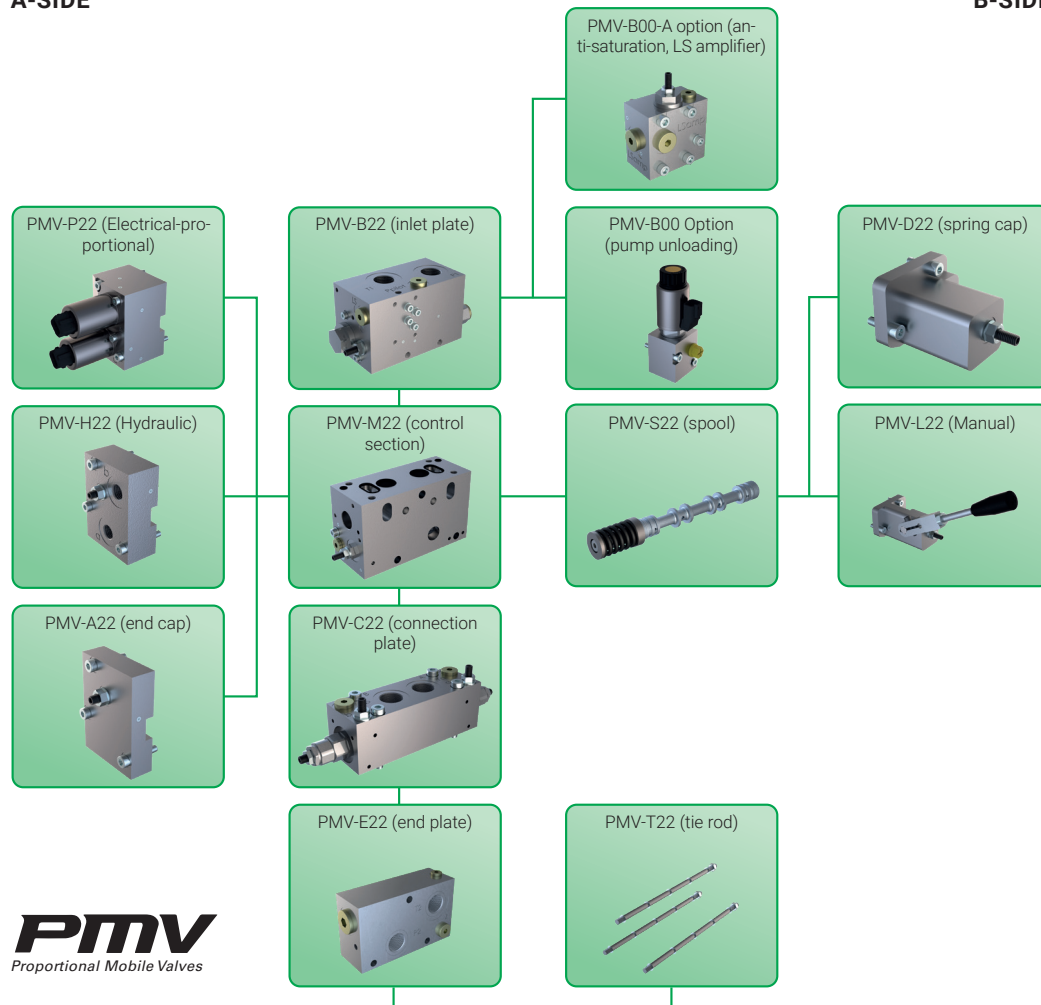
The areas of application offer great diversity. PMV are used where compact installation dimensions are required and a function requires sensitively controlled.

Typical applications are cylinder and motor controls for all handling functions as in loading cranes, telescopic handlers, aerial platforms, municipal vehicles, construction machinery, drilling equipment, agricultural and forestry machinery, offshore applications, underground mining.

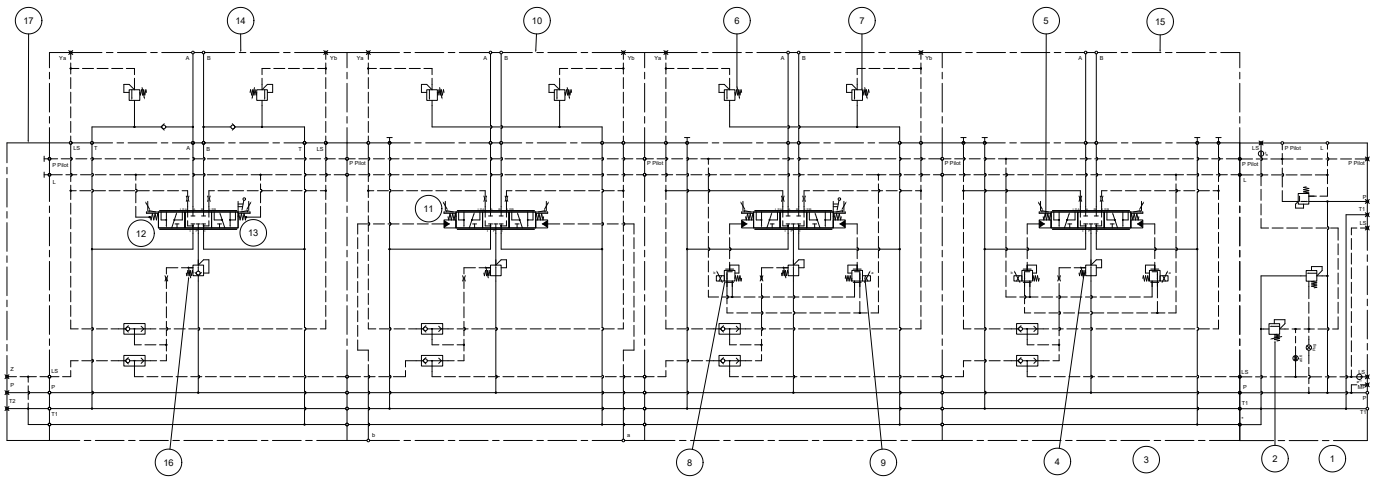
OVERVIEW PMV

A-SIDE

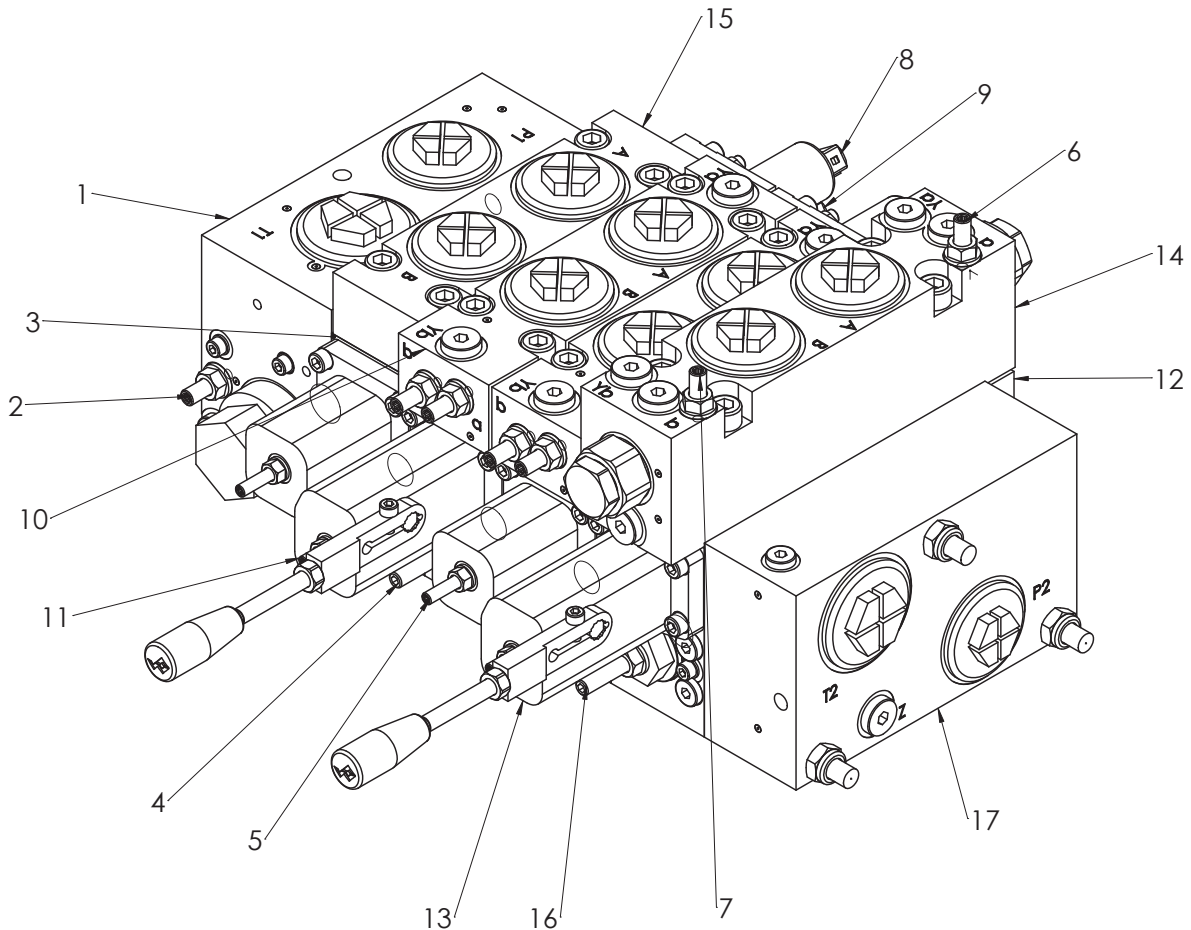
B-SIDE



OVERVIEW PMV EXAMPLE UNIT



- | | |
|---|---|
| 1: Inlet plate | 10: Connection plate with LS pressure reliefs |
| 2: Input pressure limitation | 11: Stroke limitation |
| 3: Control section | 12: End cap |
| 4: 2-way compensator with delta p setting | 13: Spring cap with manual actuation |
| 5: Stroke limitation | 14: Connection plate with LS pressure reliefs and suction function |
| 6: LS relief valve A | 15: Connection plate |
| 7: LS relief valve B | 16: 2-way compensator with delta p setting and check valve function |
| 8: Proportional pressure reducing valve A | 17: End plate |
| 9: Proportional pressure reducing valve B | |



GENERAL SPECIFICATIONS

Designation	Proportional spool valve
Construction type	Sectional design pilot operated
Mounting type	Inline mounting Any mounting position
Dimension	Nominal size 22
Number of control sections	Max. 10
Temperature range environment	-30...+70 °C
MTTFd	150 years

ELECTRICAL SPECIFICATIONS

Nominal voltage	12 VDC or 24 VDC
Type of protection	Connection version D: IP65 Connection version J: IP66 Connection version G: IP67 and IP69K
Connection	Connector socket D: DIN, EN175301-803 / ISO 4400 Connector socket J: AMP Junior Timer Connector socket G: Deutsch DT04 – 2P
Relative duty factor	100% DF
Dither frequency for proportional solenoids (recommended)	100 Hz

SEALING MATERIALS

HNBR as standard, FKM (Viton) as option

ACTUATION

Possible modes of operation	<ul style="list-style-type: none"> Electrically pilot operated (12V/24V) Hydraulically pilot operated (6-22 bar) Manual
-----------------------------	--

Manual override (lever) optional with electric and hydraulic operating form.

HYDRAULIC SPECIFICATIONS

Operating pressure P, A/B	$p_{max} = 420$ bar
Tank pressure	$p_{Tmax} = 35$ bar
Maximum volume flow Q_{max}	Port P1 or P2: 400 l/min Port P1 and P2: 800 l/min Port A/B: 400 l/min and without compensator 450 l/min.
Pressure setting range	50...420 bar
Hysteresis	≤ 3 % at optimal dither signal
Fluid	Mineral-based or synthetic hydraulic fluid with lubricating properties
Viscosity range	12 mm ² /s...320 mm ² /s
Temperature range fluid	-30...+80 °C (HNBR) -15...+80 °C (Viton)
Contamination efficiency	Class 18 / 16 / 13 ISO 4406
Filtration	Recommended filtration grade beta 6...10 ≥ 75

SURFACE TREATMENTS K8

- Most external parts are zinc-nickel coated (K8).
- The fixing screws are zinc coated.
- Adjusting screws are in stainless steel.

INLET PLATE PMV-B22 AND R22



Plate type

- B22 Inlet plate size 22
- R22 Reduction plate size 22/16

Plate version

- F For fixed displacement pump
- H For fixed displacement pump high flow
- V For LS pump
- P For LS pump with main relief valve in P

Max. pressure main relief

- 1 p_{max} 100 bar
- 4 p_{max} 420 bar

Port connection

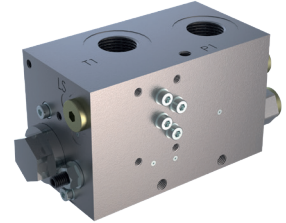
- G Thread in BSP
- S Thread in SAE-ORB

Seal type

- D4 Seals HNBR 90
- D1 Seals Viton

Surface protection

- K8 Zinc-nickel



FIXED DISPLACEMENT PUMP

The PMV inlet plate type B/R22-F/H is used for fixed displacement pumps.

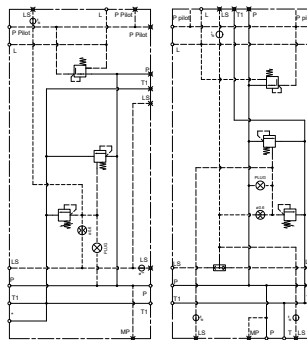
This inlet plate includes a 3-way pressure compensator for the recirculation function, as well as a maximum pressure setting. The adjustment range of the maximum pressure setting is 14 to 420 bar.

The inlet plate type B/R22-F is suitable for flows up to 250 l/min with one control section. For higher flow rates, the inlet plate type B/R22-H is required. Max. flow with the H-compensator is 310 l/min.

If no control section is actuated, the pump flow recirculates to the tank without pressure.

When one or more control sections are actuated, the highest load pressure signal is fed back to the 3-way pressure compensator, pressurising the pump line.

SCHEME F / H



PMV-B22-F/H

PMV-R22-F/H

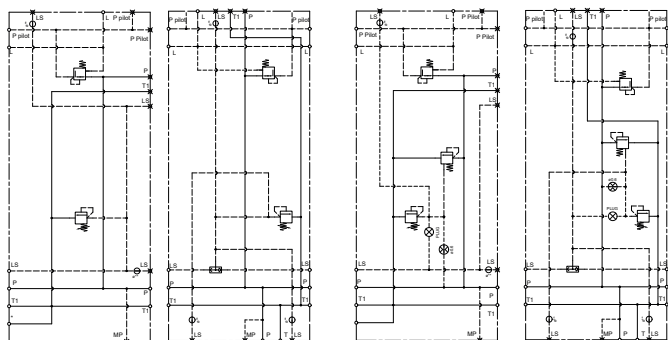
VARIABLE PUMP (LS PUMP)

The PMV inlet plate type B/R22-V/P is used for load sensing pumps (LS pumps).

The PMV inlet plate of type B/R22-V has the ports P, T and the LS signal. The LS signal can be adjusted up to 420 bar via the pressure setting.

The type B/R22-P inlet plate also has a maximum pressure setting in P to provide additional protection for the system.

SCHEME V / P



PMV-B22-V

PMV-R22-V

PMV-B22-P

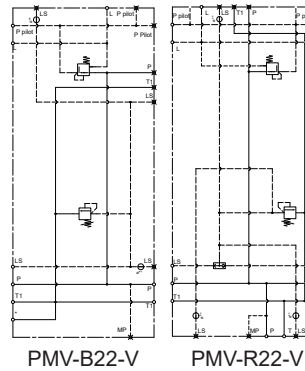
PMV-R22-P

PRESSURE COMPENSATED LS PUMP

The PMV inlet plate type B/R22-V is used for pressure compensated LS pumps (constant pressure networks).

The inlet plate is used to connect P and T, whereby the LS connection is closed here.

The LS signal can be adjusted to up to 420 bar via the pressure relief.

SCHEME V

ANTI-SATURATION, LS AMPLIFIER PMV-B00 (OPTION FOR INLET PLATE)


A Anti-saturation and LS amplifier (in combination with V or P inlet plate)

Port connection

G Thread in BSP

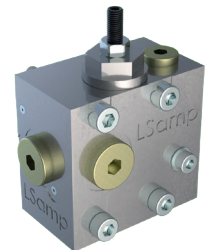
Seal type

D4 Seals HNBR 90

D1 Seals Viton

Surface protection

K8 Zinc-nickel


OPTION ANTI-SATURATION, LS AMPLIFIER

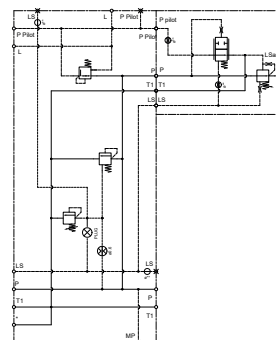
The anti-saturation option is used for electrically and hydraulically operated valves.

If insufficient pump flow is provided to the valve block, then the anti-saturation function reduces the feed pressure of the pilot circuit. This enables the simultaneous and load pressure independent operation of the individual functions.

The LS amplifier option amplifies the LS signal in the direction of the pump and compensates for signal losses. This is useful if the LS pump has its own internal pressure relief, which causes LS signal pressure losses. This option can also be used for stability adjustments between pump and valve block.

SCHEME B00-A

PMV-B22-P PMV-B00-A



PUMP UNLOADING PMV-B00 (OPTION TO INLET PLATE)

Pump unloading and electrical-proportional pressure relief

- O Normally open
- C Normally closed
- P Electrical proportional pressure relief
- I Inverse electrical-proportional pressure relief

Voltage

- 12 12 Volt DC
- 24 24 Volt DC

Electrical specifications

- SD Connector socket DIN, EN175301-803 / ISO 4400
- SG Connector socket Deutsch DT04 - 2P

Port connection

- G Thread in BSP

Seal type

- D4 Seals HNBR 90
- D1 Seals Viton

Surface protection

- K8 Zinc-nickel


MAX. PRESSURE FOR PMV-B00 K8

$p_{max} = 350 \text{ bar}$

OPTION ELECTRICAL-PROPORTIONAL PRESSURE SETTING (P / I)

With this function, the maximum pressure of the entire block can be adjusted electrically-proportionally.

This function is available in 12V DC and 24V DC.

Limiting current at 50°C : 1320 mA at 12 VDC
660 mA at 24 VDC

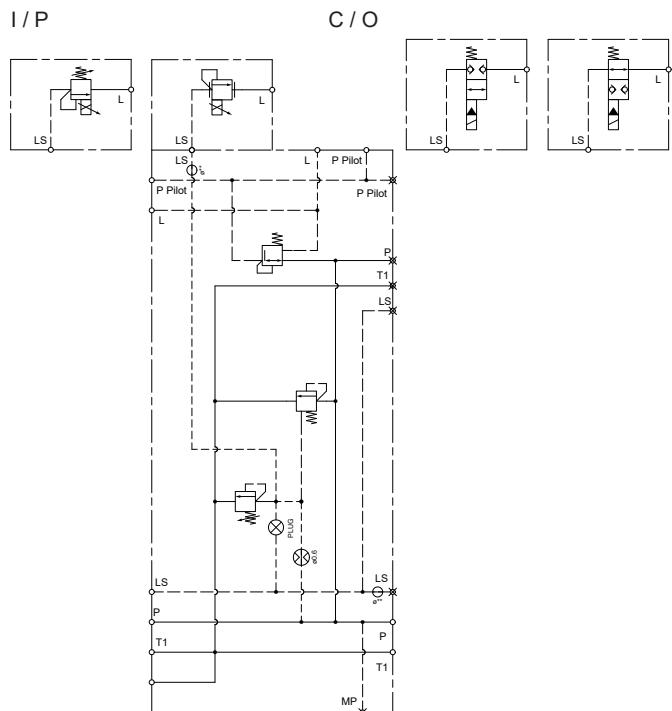
OPTION PUMP UNLOADING (O / C)

The pump unloading function can be used as an emergency stop function, for example. The LS signal of all control sections to the tank is unloaded. Both the "normally open" and the "normally closed" version are available. Please note that the stand-by pressure or the pressure in the pump line remains despite the function activation.

The 12VDC respectively 24VDC solenoids have an electrical power of 20 watt.

INSTALLED VALVES

Type	Designation	Data sheet no.
O	Normally open	-
C	Normally closed	1.11-208B
P	Electrical-proportional pressure relief	2.3-539
I	Inverse electrical-proportional pressure relief	2.3-548

SCHEME O / C / P / I


CONTROL SECTION PMV-M22

 PMV - M22 - - - - K8

Pressure compensator

- A Without pressure compensator
- B With pressure compensator
- C With pressure compensator and non-return valve function
- S Spacer plate Width = 15,25 mm (1/4" of a section)
- S1 Spacer plate Width = 30,50 mm (1/2" of a section)

Pressure compensator spring

 Nominal volume flow rate Q_N see spool kit PMV-S22

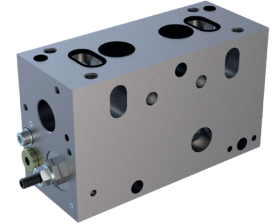
- N No pressure compensator (for option A & S only)
 - S Standard flow spring (100 % flow) 800.3204
- Spring-kit** (others on request)
- L Low flow spring (68 % flow) 800.3206
 - H High flow spring (160 % flow) 800.3205

Seal type

- D4 Seals HNBR 90
- D1 Seals Viton

Surface protection

- K8 Zinc-nickel



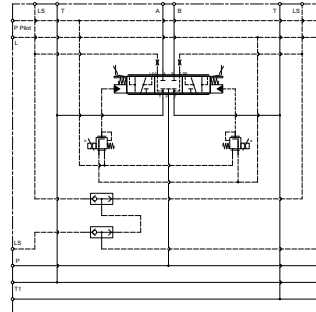
By selecting a pressure compensator in the control section, the flow rate is regulated individually and load-independently per function. Each control section can be individually configured with a wide variety of modules. The actuation functions "electrical", "hydraulic" and "manual" can be added to the control section to guarantee high flexibility of the

variants. A manual override function is also possible for the electrical and hydraulic operating modes.

The complete PMV-22 control unit can be constructed from up to 10 different control sections.

CONTROL SECTION M22-A

The M22-A unit does not have a pressure compensator.

SCHEME A

CONTROL SECTION M22-B / C

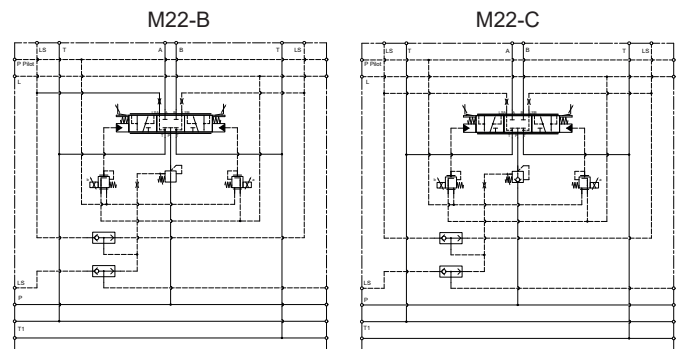
The units M22-B / C are equipped with a pressure compensator. The M22-C variant is additionally equipped with a non-return valve in the supply line to the pressure compensator to ensure the pressure independence of the individual control sections. The non-return function prevents consumer oil from flowing back into the pump channel.


NOTE!

M22-C flow decreased with 10%.
 Max flow 350 l/min across control section C.

The pressure compensation of the pressure compensator can be selected to increase or decrease the flow compared to the nominal value of the spool. The delta p of the pressure compensator is adjustable via an adjusting screw on the outside of the valve.

Tightening torque delta p adjusting screw: 10 Nm

SCHEME B / C


ELECTRICAL-PROPORTIONAL PMV-P22 FOR CONTROL SECTION

PMV - P22 - [] - [] - [] - K8

Voltage

 12 12 Volt DC
 24 24 Volt DC

Electrical specifications

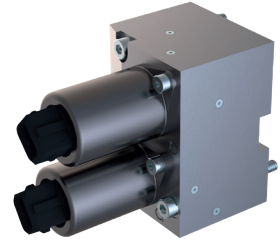
 SJ Connector socket AMP Junior Timer
 SG Plug socket Deutsch DT04 - 2P
 XA ATEX (IECEX, CCC, EAC) L15*
 XU AUS Australia L15*
 XM MA L15*
 XC UC NEC 500 / NEC 505 L15*

Seal type

 D4 Seals HNBR 90
 D1 Seals Viton

Surface protection

K8 Zinc-nickel



* Other electrical specifications see data sheet 1.1-183

ELECTRICAL-PROPORTIONAL

The electrically-proportionally actuated version uses an electrical control module that controls the main spool of the control section via 2 proportional pressure reducing valves.

The pressure reducing valves are available in 12VDC and 24 VDC with different connector versions.

The control module PMV-P22 can be used optionally in combination with the spring cap PMV-D22 or the manual override PMV-L22.

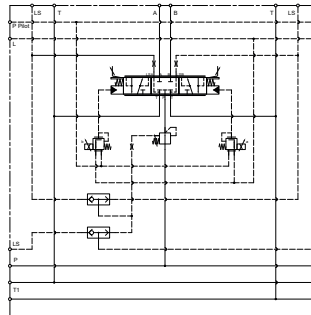
The cap contains an adjustment screw for flow limitation.

Tightening torque of the fastening screws: 10 Nm.

Tightening torque of the nut with flow limitation: 10 Nm

 Limiting current at 50°C : 1500 mA at 12 VDC
 750 mA at 24 VDC

 Solenoid resistance : 4.72 Ω ±5% at 12 VDC
 20.8 Ω ±5% at 24 VDC

SCHEME


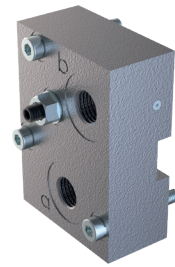
HYDRAULICAL PMV-H22 FOR CONTROL SECTION



Port connection
G Thread in BSP

Seal type
D4 Seals HNBR 90
D1 Seals Viton

Surface protection
K8 Zinc-nickel



HYDRAULICAL

In the hydraulically actuated version, instead of the electrical-proportional control module, a hydraulic control module is used, which contains ports (A, B) for the hydraulic joysticks.

The port dimension is designed in 1/4"BSP.

The pilot pressure range of the hydraulic joysticks used should be 6 to 22 bar.

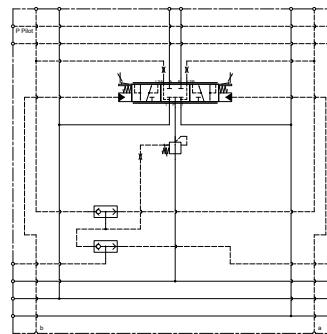
The control module PMV-H22 can be used optionally in combination with the spring cap PMV-D22 or the manual override PMV-L22.

The cap contains an adjustment screw for flow limitation.

Tightening torque of the fastening screws: 10 Nm.

Tightening torque of the nut with flow limitation: 10 Nm

SCHEME



SPRING CAP PMV-D22 FOR CONTROL SECTION

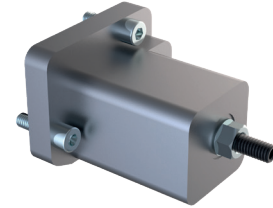
PMV - D22 - - K8

Seal type

D4 Seals HNBR 90
D1 Seals Viton

Surface protection

K8 Zinc-nickel



SPRING CAP D22

The spring cap D22 is used for the electrical and hydraulic operating form. The cap is used to hold the spring assembly and contains an adjustment screw for flow limitation.

Tightening torque of the fastening screws: 10 Nm.
Tightening torque of the nut with flow limitation: 10 Nm

MANUAL PMV-L22 FOR CONTROL SECTION

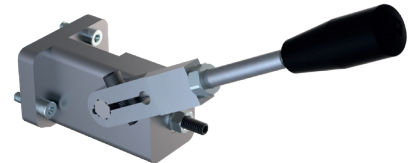
PMV - L22 - - K8

Seal type

D4 Seals HNBR 90
D1 Seals Viton

Surface protection

K8 Zinc-nickel



MANUAL L22

The manual cap L22 is used for the manually operated function only or the manual override function.

The cap is used to hold the spring assembly and contains an adjustment screw for flow limitation.

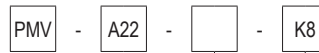
Tightening torque of the fastening screws: 10 Nm.
Tightening torque of the nut with flow limitation: 10 Nm

Max. lever force: 35 N

Centre position lever: Standard horizontal,
can optionally be mounted rotated by 30° in both directions.

Lever stroke range for full deflection: +/- 30°

MANUALLY OPERATED PMV-A22 FOR CONTROL SECTION

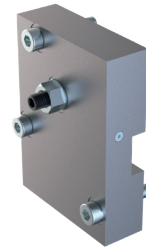


Seal type

D4 Seals HNBR 90
D1 Seals Viton

Surface protection

K8 Zinc-nickel



MANUALLY ACTUATED

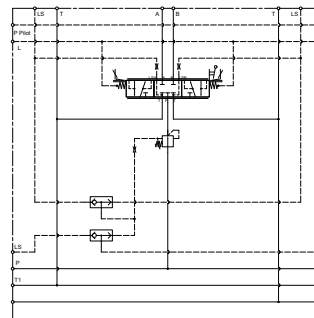
For fully manual control sections, the end cap A22 is used in combination with the manual cap L22.

The cap contains an adjustment screw for flow limitation.

Tightening torque of the fastening screws: 10 Nm.

Tightening torque of the nut with flow limitation: 10 Nm

SCHEME



SPOOL PMV-S22



Symbol Spool

ACB
ADB

Ratio

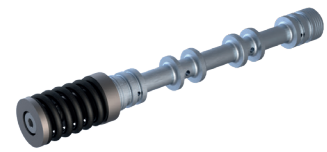
1 1:1
2 2:1 (high flow in A)

Nominal volume flow rate Q_N

250 250 l/min

Spring assembly

H Manual control only (A22 with L22)
E Electrical / hydraulic control (P22 or H22 with D22)
O Electrical / hydraulic control – manual override (P22 or H22 with L22)



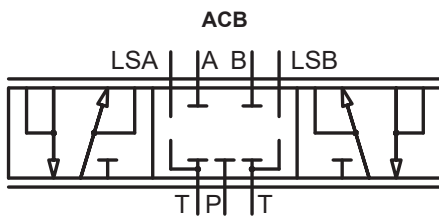
The various spool sets consist of spool and spring assembly and can be mounted in any variation in the honed bore of the control section due to the high production accuracy.

In order to cover the entire volume flow range, there are various spools with corresponding control edges.

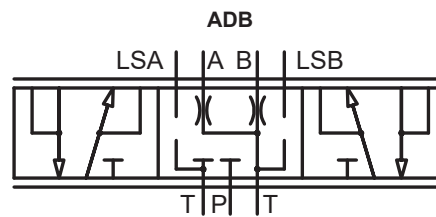
Spools with a flow ratio of 1:1, but also spools with a flow ratio of 2:1 can be configured for the corresponding cylinder applications.

The PMV programme provides a wide range of spool types. The most common spools are available with closed or open centre position, but special shapes are also available. Flexibility is further increased with the choice of pressure compensator delta p setting in the control section to precisely set the required flow rate.

SYMBOL



Spool with closed centre position



Spool with open centre position
A / B 20 % open to the tank

CONNECTION PLATE PMV-C22

 PMV - C22 - - - - - - - - - K8

Type

- N A/B port only
- H A/B port & LS relief
- C A/B port & LS relief & optional cartridge
- T Twin plate, port connection F/F1 only
- A Adapter plate in combination with F1 Twin plate

Max. setting LS pressure relief

- N Without (only N & T with F1 plate)
- 1 100 bar (not optional for N & T with F1)
- 4 420 bar (not optional for N & T with F1)

Cartridge options side A

- N No options (If C or T no cartridge mounted)
- T Shock suction function For type C & T (F)
- A Pressure relief in user port, 50-420 bar For type C & T (F)
- S Suction function For type C & T (F)

Cartridge options side B

- N No options (If C or T no cartridge mounted)
- T Shock suction function For type C & T (F)
- A Pressure relief in user port, 50-420 bar For type C & T (F)
- S Suction function For type C & T (F)

Port connection

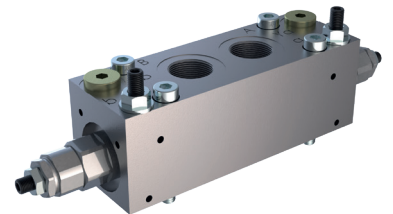
- N Connection surface (Adapter plate)
- G Thread in BSP
- S Thread in SAE-ORB
- F Flange SAE 1", code 62
- F1 Flange SAE 1-1/2", code 62

Seal type

- NN No seals (N plate only)
- D4 Seals HNBR 90
- D1 Seals Viton

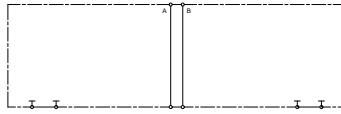
Surface protection

- K8 Zinc-nickel

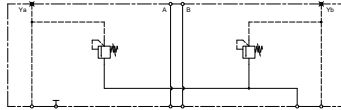


CONNECTION PLATE C22-N

The basic connecting plate type C22-N has only the ports A and B.

SCHEME N

CONNECTION PLATE C22-H

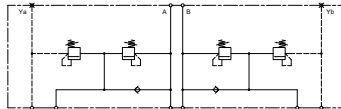
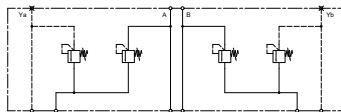
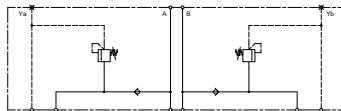
LS pressure relief valves are integrated in the connection plate type C22-H on the A and B sides.

SCHEME H

CONNECTION PLATE C22-C

The connection plate type C22-C is an extended design.

In addition to the LS pressure relief valves, this plate can be extended with additional cartridges for various functions. Possible variants of built-in cartridges are the suction function (S), the pressure relief function (A) and the shock suction function (T). The cartridges can be used independently on the A and B sides.

These additional valves in A and B act directly on the working port. This is in contrast to the LS pressure limitations, which act on the LS signal.

SCHEME C
C-TT

C-AA

C-SS

SURFACE TREATMENTS

Cartridges for PMV-C22-C are zinc coated.

CONNECTION PLATE C22-T
Twin plate with SAE 1" connection

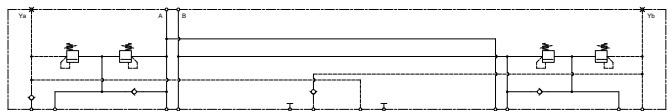
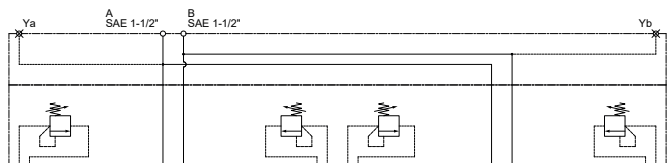
The connection plate type C22-T is an extended design called Twin plate. It combines the flow from two sections.

In addition to the LS pressure relief valves, this plate can be extended with additional cartridges for various functions. Possible variants of built-in cartridges are the suction function (S), the pressure relief function (A) and the shock suction function (T). The cartridges can be used independently on the A and B sides.

These additional valves in A and B act directly on the working port. This is in contrast to the LS pressure limitations, which act on the LS signal.

Twin plate with SAE 1-1/2" connection

For SAE 1-1/2" connection an adapter plate is required where the LS pressure relief valves are mounted (2 in the A ports and 2 in the B ports). The Twin plate with SAE 1-1/2" connections is mounted on the Adapter plate. These have no additional valve functions integrated.

SCHEME T
T-TT

T-F1 WITH A (ADAPTER PLATE)


END PLATE PMV-E22

 PMV - E22 - - - - K8

Plate version

- A Small end plate without ports
- B With additional P2 and T2port
- C With Z port, with additional P2 and T2 port

Port connection

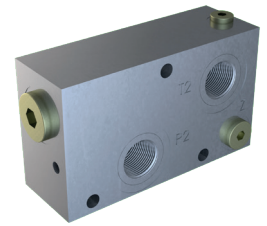
- G Thread in BSP
- S Thread in SAE-ORB
- N No ports (A plate only)

Seal type

- NN No seals (A plate only)
- D4 Seals HNBR 90
- D1 Seals Viton

Surface protection

- K8 Zinc-nickel


SMALL END PLATE E22-A

The PMV end plate type E22-A only contains the LS pressure relief of the shuttle valve cascade.


NOTE!

Using the reduction inlet plate PMV-R22, it is necessary to have on both sides the (wide) endplate. PMV-E22-B/C (size 22 side) and PMV-E16-B/C (size 16 side)

SCHEME A

WIDE END PLATE E22-B

The PMV end plate type E22-B includes an extra P and T port in addition to the LS pressure relief of the shuttle valve cascade.

SCHEME B

WIDE END PLATE E22-C

The PMV end plate type E22-C includes an extra P and T port.

In addition, the LS signal of a downstream valve unit can be connected to the upstream valve unit via the Z port (series connection of two blocks).

SCHEME C


Tie rods



- S01 Tie rod kit small, end plate A, 1 section
- S02 Tie rod kit small, end plate A, 2 sections
- S03 Tie rod kit small, end plate A, 3 sections
- S04 Tie rod kit small, end plate A, 4 sections
- S05 Tie rod kit small, end plate A, 5 sections
- S06 Tie rod kit small, end plate A, 6 sections
- S07 Tie rod kit small, end plate A, 7 sections
- S08 Tie rod kit small, end plate A, 8 sections
- S09 Tie rod kit small, end plate A, 9 sections
- S10 Tie rod kit small, end plate A, 10 sections

- W01 Tie rod kit wide, end plate B/C, 1 section
- W02 Tie rod kit wide, end plate B/C, 2 sections
- W03 Tie rod kit wide, end plate B/C, 3 sections
- W04 Tie rod kit wide, end plate B/C, 4 sections
- W05 Tie rod kit wide, end plate B/C, 5 sections
- W06 Tie rod kit wide, end plate B/C, 6 sections
- W07 Tie rod kit wide, end plate B/C, 7 sections
- W08 Tie rod kit wide, end plate B/C, 8 sections
- W09 Tie rod kit wide, end plate B/C, 9 sections
- W10 Tie rod kit wide, end plate B/C, 10 sections



TIE RODS

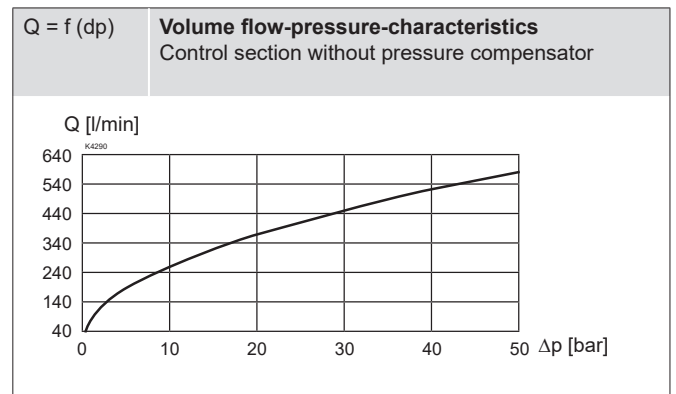
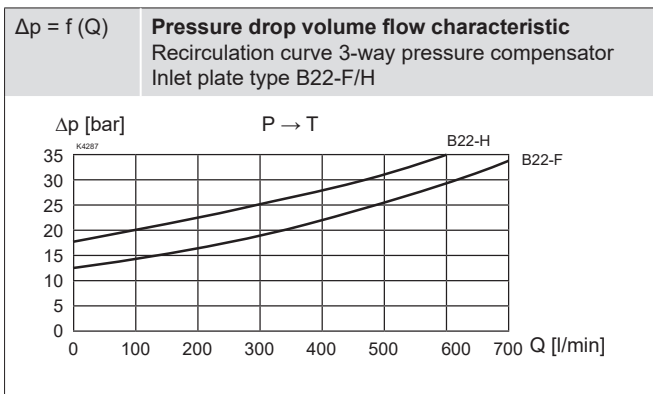
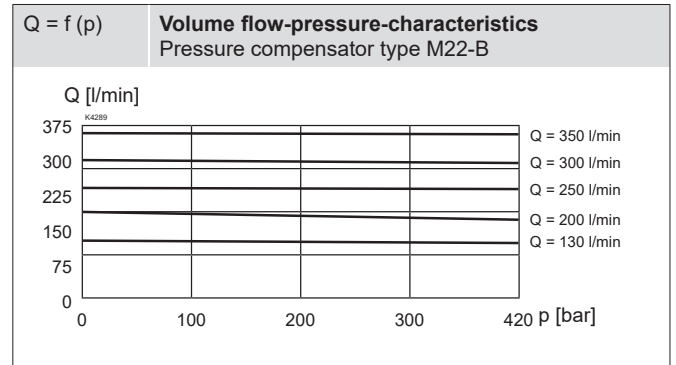
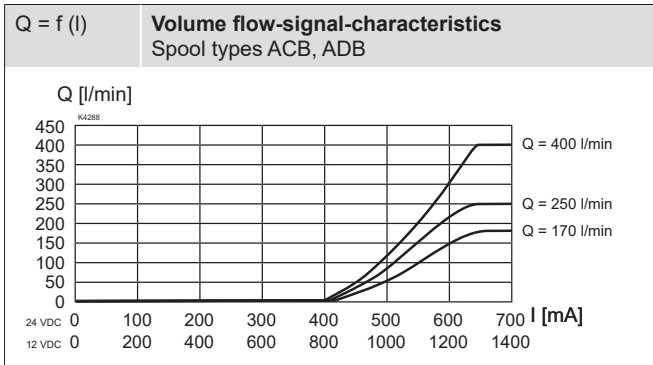
For the assembly of complete PMV-22 control blocks, 2 different tie rod kits are available, which are used depending on the type of end plate used.

The tie rod kits each consist of 3 pcs. tie rods and M10 nuts with plastic caps.

The tie rods are in Cr-steel material and the M10 nuts are Zinc-nickel coated

PERFORMANCE SPECIFICATIONS

Oil viscosity = 30 mm²/s



ASSEMBLY OF THE CONTROL UNIT

Various M10x12 mounting threads are available for the assembly of the control unit:

Inlet plate:
 PMV-B22: 6 x mounting thread M10x12

End plate:
 PMV-E22: 3 x mounting thread M10x12

HYDRAULIC PORT

Port	BSP	SAE ORB
Port P	G 1 1/4"	20
Port T	G 1 1/2"	24
Port A, B	G 1 1/4"	20
Port LS	G 1/4"	6
Port L (Drain)	G 1/4"	6
Port Ya, Yb	G 1/4"	6
Port Z	G 1/4"	6

WEIGHTS PER PMV MODULE

PMV-B22-F/H	11,7 kg
PMV-B22-V	10,9 kg
PMV-M22	6,8 kg
PMV-P22	1,4 kg
PMV-P22-XA	4,2 kg
PMV-H22	0,8 kg
PMV-D22	0,5 kg
PMV-L22	1,1 kg
PMV-A22	0,6 kg
PMV-S22	0,4 kg
PMV-C22-N	2,2 kg
PMV-C22-H	2,9 kg
PMV-C22-C	6,2 kg
PMV-C22-T	11,0 kg
PMV-E22-A	2,7 kg
PMV-E22-B	7,2 kg
PMV-R22	12,7 kg

WEIGHTS PER TIE ROD KIT

PMV-T22-W01	0,3 kg
PMV-T22-W02	0,4 kg
PMV-T22-W03	0,5 kg
PMV-T22-W04	0,6 kg
PMV-T22-W05	0,8 kg
PMV-T22-W06	0,9 kg
PMV-T22-W07	1,0 kg
PMV-T22-W08	1,1 kg
PMV-T22-W09	1,2 kg
PMV-T22-W10	1,3 kg

ASSEMBLY INSTRUCTIONS

Type of mounting	Control unit in sandwich construction with threaded connection. Mounting holes on the inlet and end plate M10 x 12
Mounting position	any
Tightening torque	M = 46 Nm
Tie rods	
Socket Tool	17 mm

WEIGHTS PER PMV MODULE

PMV-B00-A-G	1,0 kg
PMV-B00-I-G	1,4 kg
PMV-B00-P-G	1,4 kg
PMV-B00-O-G	0,8 kg
PMV-B00-C-G	0,7 kg

WEIGHTS PER TIE ROD KIT

PMV-T22-S01	0,2 kg
PMV-T22-S02	0,3 kg
PMV-T22-S03	0,5 kg
PMV-T22-S04	0,6 kg
PMV-T22-S05	0,7 kg
PMV-T22-S06	0,8 kg
PMV-T22-S07	0,9 kg
PMV-T22-S08	1,0 kg
PMV-T22-S09	1,1 kg
PMV-T22-S10	1,2 kg